

2008 Recreational Red Snapper Quota Closure Analysis
NOAA Fisheries Service
March 8, 2008

Introduction

On February 28, 2008, new red snapper regulations were implemented to reduce recreational red snapper harvest in the Gulf of Mexico. Recreational management measures approved by the Gulf of Mexico Fishery Management Council in Amendment 27/14 to the Reef Fish and Shrimp Fishery Management Plans include a:

- 2.45 mp recreational quota,
- Two fish bag limit;
- June 1-September 30 recreational fishing season; and,
- Prohibition on captain and crew retaining bag limits of red snapper while under charter.

These regulations are estimated to reduce recreational harvest by 45 percent.

During development of Amendment 27/14 it was assumed Gulf States would comply with the newly proposed recreational regulations. However, recently both the states of Texas and Florida have voted not to adopt recreational state water regulations that are consistent with federal water regulations. Texas state waters will continue to remain open year round and anglers will be allowed a bag limit of 4 fish. In Florida state waters, anglers will be allowed two fish, but the season length will be 78 days longer than the federal fishing season (April 15-October 31). It is unknown whether or not other states will comply with federal regulations, although few red snapper are caught in state waters off Louisiana, Mississippi, and Alabama because these states only have jurisdiction out to 3 nautical miles.

Given the inconsistencies in state and federal regulations, landings are likely to exceed the 2008 recreational quota if an adjustment to the federal waters red snapper recreational fishing season length is not made. The following provides an estimate of 2008 recreational red snapper landings if the federal waters fishing season (June 1-September 30) is not shortened. Also provided is an estimate of how much the 2008 federal waters recreational red snapper fishing season would need to be shortened to constrain landings to the 2.45 million pound recreational red snapper quota.

Methods and Results

The following describes the methods used to estimate 2008 red snapper recreational landings and the 2008 federal waters recreational red snapper season length. Historical landings were used to project both landings and season length. The most recent annual estimates of landings for all sectors were used to project landings. Where necessary, landings were adjusted for changes in regulations (e.g., lower bag limit, shorter season length).

Step 1: Louisiana through Florida Federal Water Private and Charter Landings. During 2007, the red snapper bag limit was reduced to two fish in federal waters (starting May 2, 2007), but no changes were made to the red snapper season length (April 21-October 31). To estimate federal water charter and private vessel red snapper landings for 2008, 2007 Marine Recreational Fisheries Statistical Survey (MRFSS) federal water landings for waves 3-5 were used. In 2008, the federal red snapper season will be shortened from April 21-October 31 to June 1-September 30. To estimate federal water landings by state and mode for June and September, landings for waves 3 and 5 in 2007 were multiplied by 30 (number of days in each month) and divided by 61 (the number of days in each wave). These landings were then added to wave 4 landings to estimate total federal water landings by state and mode for 2008. It is estimated the charter and private sectors from Louisiana to West Florida will land 643,582 pounds and 811,953 pounds of red snapper in federal waters in 2008, respectively.

Mode	Wave	Federal Water Landings (lbs) by State				
		AL	LA	MS	WFL	Total
Charter	June	79766	31807	0	112667	224239
	July-Aug	146269	64663	0	140960	351892
	Sept	24199	4347	0	38906	67451
	Jun-Sept	250233	100816	0	292532	643582
Private	June	52427	16813	0	76702	145942
	July-Aug	70635	167651	6726	310890	555902
	Sept	27751	51187	0	31171	110110
	Jun-Sept	150813	235652	6726	418763	811953

Step 2: Texas Federal Water Private and Charter Landings. Charterboat and private vessel landings off Texas are estimated by the Texas Parks and Wildlife Department (TPWD). Annual landings are available through 2006. Landings for 2007 will be available later this spring. To estimate federal water landings off Texas, TPWD charter and private landings (in numbers of fish) were first summarized by wave. Landings in numbers were then converted to pounds landed using TPWD mean length data for each wave and area fished (state vs. federal waters) and the length-weight conversion formula for red snapper in SEDAR 7 (2005). Federal water landings were then estimated by mode for June through September using the same methods as described in Step 1. This estimate of landings was then reduced to account for implementation of a 2 fish federal waters bag limit and prohibition on captain and crew beginning in 2007. Bag limit reductions assumed for each mode of fishing are summarized in Appendix 1. These reductions are based on more detailed analyses described in SERO 2006a and SERO 2006b. It is estimated the Texas charter and private sectors will land 15,574 pounds and 52,828 pounds of red snapper in federal waters in 2008, respectively.

Mode	Wave	Landings (lbs)	
		Unadjusted	Adjusted - 2 fish bag
Charter	June	6355	3692
	July-Aug	17308	10056
	Sept	3143	1826
	Jun-Sept	26805	15574
Private	June	24214	16877
	July-Aug	45309	31580
	Sept	6270	4370
	Jun-Sept	75793	52828

Step 3: Louisiana and Mississippi State Water Landings. In 2007, Louisiana and Mississippi adopted consistent red snapper regulations with the federal government. It is assumed these states will continue to maintain consistent regulations. MRFSS landings were calculated for June through September using the same methods as described in Step 1. It is estimated Louisiana and Mississippi charter and private sectors will land 5,507 pounds and 30,844 pounds of red snapper in state waters in 2008, respectively.

Mode	Wave	Landings (lbs) by State		
		LA	MS	Total
Charter	June	5507	0	5507
	July-Aug	0	0	0
	Sept	0	0	0
	Jun-Sept	5507	0	5507
Private	June	0	0	0
	July-Aug	30844	0	30844
	Sept	0	0	0
	Jun-Sept	30844	0	30844

Step 4: Alabama State Water Landings. In 2007, the state of Alabama did not adopt consistent red snapper regulations with the federal government. For 2008, it was assumed Alabama would adopt consistent regulations. MRFSS landings were calculated for June through September using the same methods as described in Step 1. Estimated state water landings were then adjusted to account for implementation of a lower two fish bag limit and prohibition on captain and crew beginning in 2008 (Appendix 1). It is estimated Alabama charter and private sectors will report landing 146 pounds and 41,326 pounds of red snapper from state waters in 2008, respectively.

Mode	Wave	Landings (lbs)	
		Unadjusted	Adjusted - 2 fish bag
Charter	June	240	146
	July-Aug	0	0
	Sept	0	0
	Jun-Sept	240	146
Private	June	28230	21675
	July-Aug	16698	12821
	Sept	8896	6830
	Jun-Sept	53824	41326

Step 5: Florida State Water Landings. In 2007, the state of Florida did not adopt consistent regulations with the federal government. In February 2008, the state of Florida voted to reduce the red snapper bag limit to 2 fish in state waters and prohibit captain and crew from retaining bag limits of red snapper while under charter. The state of Florida also voted to maintain the April 15-October 31 red snapper fishing season in state waters. Florida MRFSS landings for waves 2-5 in 2007 were used to estimate state water landings in pounds. Landings were then adjusted for reductions in the bag limit (and captain and crew prohibition) that will take effect later this spring (Appendix 1). It is estimated Florida charter and private sectors will land 307,931 pounds and 502,977 pounds of red snapper in state waters in 2008, respectively.

Mode	Wave	Landings (lbs)	
		Unadjusted	Adjusted - 2 fish bag
Charter	Apr 15-30	47015	28510
	May-Jun	210938	127913
	July-Aug	198795	120549
	Sept-Oct	51054	30959
	Apr 15-Oct	507802	307931
Private	Apr 15-30	62675	48122
	May-Jun	243987	187333
	July-Aug	244217	187510
	Sept-Oct	104209	80012
	Jun-Sept	655088	502977

Step 6: Texas State Water Landings. In 2007 and 2008, Texas did not adopt consistent red snapper regulations with the federal government. Texas will maintain a 4-fish bag limit in state waters, allow captain and crew to retain bag limits of red snapper, and allow a year round recreational red snapper fishing season. Total 2006 state water landings in numbers of fish were estimated from TPWD data by wave. Landings in numbers were then converted to landings in pounds using mean lengths by mode and area fished and the SEDAR 7 (2005) length-weight conversion formula. It is estimated Texas charter and private sectors will land 3,059 pounds and 84,472 pounds of red snapper in state waters in 2008, respectively.

Mode	Wave	Landings (lbs)
Charter	Jan-Feb	0
	Mar-Apr	0
	May-Jun	924
	Jul-Aug	987
	Sept-Oct	1148
	Nov-Dec	0
	Jan-Dec	3059
Private	Jan-Feb	3850
	Mar-Apr	16044
	May-Jun	23712
	Jul-Aug	23020
	Sept-Oct	9657
	Nov-Dec	8459
	Jan-Dec	84742

Step 7: Headboat Landings. Headboat landings are collected through the SEFSC headboat survey. Landings are available through 2006 by state, with the exception of Louisiana. The most recent landings available for Louisiana are from 2003. Landings for Louisiana were included in the survey in 2007 (not yet available), but were not included in the survey during 2004-2006 due to a lack of funding and staff and Hurricane Katrina. Headboat landings are reported by month and statistical area fished. Distance from shore (state vs. federal waters) is provided in a data file separate from the headboat landings data file; therefore, landings by area fished must be estimated using ratios derived from the catch-effort data file. Ratios of state versus federal water landings by statistical area and month were computed using the catch-effort files and multiplied with monthly headboat landings reported by statistical area to determine total state and federal water landings. Landings for 2008 were then estimated as follows. Federal

water landings were summed for June-September and then adjusted for implementation of the 2-fish bag limit (and captain and crew prohibition) (Appendix 1). No landings were reported in Alabama state waters for 2006. Landings for Louisiana state waters were not available because distance from shore was not added to the headboat survey until 2004. Therefore, it was assumed that all headboat landings for Louisiana in 2003 were from federal waters, since Louisiana has a 3-mile limit for their territorial sea. No headboat landings were reported for Mississippi in either state or federal waters for 2006. Headboat landings for Texas state waters were estimated as the sum of January-December 2006 landings. No adjustments were made to Texas state water landings because no changes are proposed to the 2008 Texas state waters red snapper fishing season or red snapper bag limits. Finally, Florida state water landings were estimated by summing April-October 2006 landings. These landings were then adjusted to account for implementation of a 2-fish bag limit (and captain and crew prohibition) beginning in 2008 (Appendix 1). It is estimated that headboat landings in 2008 will total 280,943 pounds Gulfwide.

State	Area	Season	Landings	Adjusted Landings
Texas	State	Jan-Dec	25049	25049
	Federal	Jun-Sept	256792	182399
Louisiana	State	Jun-Sept	0	0
	Federal	Jun-Sept	13367	9495
Mississippi	State	Jun-Sept	0	0
	Federal	Jun-Sept	0	0
Alabama	State	Jun-Sept	0	0
	Federal	Jun-Sept	24745	20850
Florida	State	Apr 15-Oct 31	5790	4879
	Federal	Jun-Sept	45420	38271
Total	All	n/a	371163	280943

Step 8: Total Landings for 2008 with No Adjustment to the Federal Waters Recreational Red Snapper Fishing Season. Landings estimated in Steps 1-7 were next summed to determine total estimated landings for 2008. Estimated recreational red snapper landings without adjusting the federal waters red snapper fishing season were 2.78 million pounds. These landings represent a 13.5 percent overage in the 2008 recreational quota.

Step	Mode	Area	Season	Landings (lbs)
1	Charter	FL-LA federal	Jun-Sept	643582
1	Private	FL-LA federal	Jun-Sept	811953
2	Charter	TX federal	Jun-Sept	15574
2	Private	TX federal	Jun-Sept	52828
3	Charter	LA-MS state	Jun-Sept	5507
3	Private	LA-MS state	Jun-Sept	30844
4	Charter	AL state	Jun-Sept	146
4	Private	AL state	Jun-Sept	41326
5	Charter	FL state	Apr 15-Oct 31	307931
5	Private	FL state	Apr 15-Oct 31	502977
6	Charter	TX state	Jan-Dec	3059
6	Private	TX state	Jan-Dec	84742
7	Headboat	all	Varies by area fished	280943
Total Landings				2781412

Step 9: Estimated Federal Waters Recreational Red Snapper Fishing Season Length. The length of the federal waters fishing season was shortened until total landings were estimated to approximate the 2.45 million pound recreational red snapper quota. Methods for estimating federal water landings were the same as those described in Steps 1, 2, and 7, except only landings data from June through August were used. It was assumed Gulf States would not adjust their red snapper fishing seasons in response to adjustments to the federal waters fishing season; therefore, no adjustments were made to state water landings (Steps 3-6). The federal waters fishing season was estimated to be 37 days shorter (June 1-August 24) than the fishing season proposed in Amendment 27/14.

Step	Mode	Area	Season	Landings (lbs)
1	Charter	FL-LA federal	Jun - Aug 24	529981
1	Private	FL-LA federal	Jun - Aug 24	628939
2	Charter	TX federal	Jun - Aug 24	17370
2	Private	TX federal	Jun - Aug 24	67347
3	Charter	LA-MS state	Jun-Sept	5507
3	Private	LA-MS state	Jun-Sept	30844
4	Charter	AL state	Jun-Sept	146
4	Private	AL state	Jun-Sept	41326
5	Charter	FL state	Apr 15-Oct 31	307931
5	Private	FL state	Apr 15-Oct 31	502977
6	Charter	TX state	Jan-Dec	3059
6	Private	TX state	Jan-Dec	84742
7	Headboat	all	Varies by area fished	213241
Total Landings				2433410
Estimated Overage				-16590
Percent Underage				-0.7%

Step 10: Total Landings for 2008 based on 75 and 95 Percent Upper Confidence Limits.

There is a 50 percent probability that landings estimated in Step 8 may be higher or lower than 2.82 million pounds. To evaluate changes in the federal waters red snapper recreational fishing season length based on different probabilities of landings being exceeded, confidence limits were constructed for the landings summarized in Step 8. The headboat survey largely represents a census of headboats in the Gulf of Mexico; therefore no adjustments to headboat landings were made. The MRFSS estimates landings and the percent standard error (PSE) of the landings. The PSE represents an expression of the standard error as a percentage of the estimate. The smaller the PSE, the more precise the estimate. To calculate upper 75 and 95 percent confidence limits for MRFSS landings summarized in Steps 1 and 3-5, the PSE was multiplied by the estimated landings for each wave. This value was then multiplied by 0.6745 ($\alpha = 0.25$, t_{inf} , normal distribution) and 1.6449 ($\alpha = 0.05$, t_{inf} , normal distribution) to estimate the 75 and 95 percent confidence limits, respectively. No PSE was reported for TPWD landings. Therefore, the Gulfwide MRFSS PSE by mode, wave (2-5 only) and area fished for 2007 was used for TPWD data. For landings reported in TPWD state waters during waves 1 and 6, the Gulfwide PSE for state water landings by mode was used to estimate confidence limits. Based on the above described methods, there is a 25 percent probability that landings in 2008 will exceed 3.26 mp and a 5 percent probability that landings will exceed 3.70 mp.

Step	Mode	Area	Season	Estimated Landings (lbs)		
				50% CL	75% CL	95% CL
1	Charter	FL-LA federal	Jun-Sept	643582	724022	796424
1	Private	FL-LA federal	Jun-Sept	811953	999234	1167801
2	Charter	TX federal	Jun-Sept	15574	16771	17849
2	Private	TX federal	Jun-Sept	52828	60138	66717
3	Charter	LA-MS state	Jun-Sept	5507	9169	12465
3	Private	LA-MS state	Jun-Sept	30844	46177	59977
4	Charter	AL state	Jun-Sept	146	220	286
4	Private	AL state	Jun-Sept	41326	65236	86757
5	Charter	FL state	Apr 15-Oct 31	307931	334084	357623
5	Private	FL state	Apr 15-Oct 31	502977	624922	734683
6	Charter	TX state	Jan-Dec	3059	3341	3594
6	Private	TX state	Jan-Dec	84742	99870	113486
7	Headboat	all	Varies by area fished	280943	280943	280943
Total Landings				2781412	3264127	3698607
Estimated Overage				331412	814127	1248607
Percent Overage				13.5%	33.2%	51.0%

Step 11: Estimated Federal Waters Recreational Red Snapper Fishing Season Length based on 75 Percent Upper Confidence Limit for Landings. The recreational red snapper season length was estimated based on the 75 percent confidence limit estimates provided in Step 10. Methods were the same as those described in Step 9. It was presumed that Gulf States would not shorten their recreational red snapper fishing seasons in response to a shorter federal waters recreational red snapper fishing season; therefore, no adjustments were made to state water landings. The federal waters recreational red snapper fishing season was shortened until total landings approximated the 2.45 million pound red snapper recreational quota. It is estimated that there is a 75 percent probability that 2008 recreational red snapper landings will be equal to or less than the recreational quota if the federal waters red snapper fishing season is shortened from June 1 through September 30 to June 1 through August 4. This federal waters fishing season length is 57 days shorter than the fishing season proposed in Amendment 27/14.

Step	Mode	Area	Season	Estimated Landings (lbs)
				75% CL
1	Charter	FL-LA federal	Jun - Aug 4	477902
1	Private	FL-LA federal	Jun - Aug 4	561688
2	Charter	TX federal	Jun - Aug 4	10176
2	Private	TX federal	Jun - Aug 4	39588
3	Charter	LA-MS state	Jun-Sept	9169
3	Private	LA-MS state	Jun-Sept	46177
4	Charter	AL state	Jun-Sept	220
4	Private	AL state	Jun-Sept	65236
5	Charter	FL state	Apr 15-Oct 31	334084
5	Private	FL state	Apr 15-Oct 31	624922
6	Charter	TX state	Jan-Dec	3341
6	Private	TX state	Jan-Dec	99870
7	Headboat	all	Varies by area fished	177189
Total Landings				2449562
Estimated Overage				-438
Percent Overage				0.0%

Step 12: Estimated Federal Waters Recreational Red Snapper Fishing Season Length based on a 95 Percent Upper Confidence Limit for Landings. The recreational red snapper federal waters season length was estimated based on the 95 percent confidence limit estimates provided in Step 10. Methods were the same as those described in Step 11. It is estimated there is a 95 percent probability that 2008 recreational red snapper landings will be equal to or less than the recreational quota if the federal waters red snapper fishing season is shortened from June 1 through September 30 to June 1 through July 21. This federal waters fishing season length is 71 days shorter than the fishing season proposed in Amendment 27/14.

Step	Mode	Area	Season	Estimated Landings (lbs)
				95% CL
1	Charter	FL-LA federal	Jun - Jul 21	424813
1	Private	FL-LA federal	Jun - Jul 21	474929
2	Charter	TX federal	Jun - Jul 21	8186
2	Private	TX federal	Jun - Jul 21	34921
3	Charter	LA-MS state	Jun-Sept	12465
3	Private	LA-MS state	Jun-Sept	59977
4	Charter	AL state	Jun-Sept	286
4	Private	AL state	Jun-Sept	86757
5	Charter	FL state	Apr 15-Oct 31	357623
5	Private	FL state	Apr 15-Oct 31	734683
6	Charter	TX state	Jan-Dec	4776
6	Private	TX state	Jan-Dec	93471
7	Headboat	all	Varies by area fished	144055
Total Landings				2436942
Estimated Overage				-13058
Percent Overage				-0.5%

Discussion

Based on the results of this analysis, the maximum length of the federal waters recreational red snapper fishing season in 2008 is estimated to be 85 days. This would allow a June 1 to August 24 fishing season in federal waters. The season would have to be shortened by 37 days (30 percent) to constrain landings to the 2.45 million pound quota. There would be a 50 percent probability that landings would be equal to or greater than the 2.45 million pound quota. Taking into account uncertainty in the landings estimates using PSE and confidence limits, it is estimated that the federal waters recreational red snapper fishing season would have to be shortened further to ensure there is a greater probability that landings do not exceed the quota. If the federal waters fishing season is shortened to June 1 through August 4, there would be a 25 percent probability that landings would equal or exceed the recreational quota. If the federal waters fishing season is shortened to June 1 through July 21, there would be only a 5 percent probability that landings would equal or exceed the recreational red snapper quota.

It should be noted that this analysis assumes catch rates and landings will be similar to levels observed in 2006 and 2007 (also 2003 for Louisiana headboat). If catch rates are higher or lower than historical levels than the federal waters fishing season length may be under- or overestimated. As emphasized above, the 85 day fishing season is the maximum amount of time that the federal waters fishing season could remain open. Because this analysis does not account

for effort shifting to state waters and non-compliance with regulations, the length of the fishing season is likely overestimated. Shorter federal water red snapper fishing seasons will increase the probability that landings do not exceed the 2.45 million pound recreational quota.

References

SEDAR 7. 2005. Stock assessment report of SEDAR 7 Gulf of Mexico red snapper. SEDAR (<http://www.sefsc.noaa.gov/sedar/>), Charleston, South Carolina. 480 p.

SERO. 2006a. Evaluation of bag limits and seasonal closures for the recreational red snapper fishery under a 16-inch minimum size limit. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, Florida. 14 p.

SERO. 2006b. Red snapper captain and crew bag limit analyses. NOAA Fisheries Service, Southeast Regional Office, St. Petersburg, Florida. 2 p.

Appendix 1. Estimated reductions in red snapper landings for a 2-fish bag limit and prohibition on captain and crew retaining bag limits of red snapper while under charter. Reductions are summarized by mode for the Eastern (Mississippi-Florida) and Western Gulf (Texas and Louisiana).

Mode	Gulf Area	Bag Limit Reduction
Charter	East	39.4
	West	41.9
Private	East	23.2
	West	30.3
Headboat	East	15.7
	West	29.0